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⁂ *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

USES OF THE HOP PLANT.

IN the *Wiener Landwirthschaftliche Zeitung*, Dr. Emil Pott calls attention to the many useful purposes for which various parts of the hop plant may be applied, over and above the mere production of the umbels employed in brewing, to which alone the growers' care appears to be given at the present time. To begin with, the tendrils furnish a good vegetable wax, and a juice from which a reddish-brown colouring matter can be extracted; further, their ashes are greatly valued in the manufacture of certain Bohemian glass wares. Of still greater importance is the fact that a pulp for paper-making can be prepared from them, and though the goods thus manufactured cannot be satisfactorily bleached, very serviceable unbleached papers and cardboards are got from this raw material. The fibres can also be used in the manufacture of textile fabrics. Experiments in this direction extend to a far-back date, and in Sweden yarn and linen-making from hop fibres has long been an established branch of industry, which is constantly increasing in importance and extent. The separation of the fibres has hitherto presented considerable difficulties, but these appear to be effectually overcome by the process recently devised by Dr. Weiss, of Neutomischel, of steeping them for 24 hours in cold water containing 5 per cent. of sulphuric acid, or for 20 minutes in boiling water to which 3 per cent. of the acid has been added. Other mineral acids, such, for instance, as muriatic, may be similarly employed. Nordlinger, of Stuttgart, also has patented a plan of rendering the fibres very flexible and tractable. This he effects by boiling them in closed vessels with soap and soda, and after thorough washing treating them with diluted acetic acid, and then again washing in cold water. Another use to which hop twigs may be put is that of basket and wicker work. Lastly, it must not be forgetten that the young shoots form a very palatable vegetable, not inferior to asparagus in delicacy of flavour, while the leaves, and the spent hops themselves, supply an excellent food for live stock generally, and especially for sheep. Dr. Pott contends that by due recognition of some or all of these numerous virtues of the plant, growers can always repay the cost of cultivation without reference to the hop itself, which of course will remain the chief object in view, and can render themselves more independent of the great fluctuations in the price of the latter to which they are at present subjected.

ANTISEPTIC ACTION OF ACIDS.—According to Sieber a relatively small proportion of acid, 0·5 per cent., prevents putrefaction. This property is conspicuous in the mineral acid, and in acetic acid. Lactic and boric acids are much less effective.—*Journ. Prakt. Chemie.*

Reviews.

DR. THUDICHUM'S CHEMICAL MEDICINE.

"Annals of Chemical Medicine, including the Application of Chemistry to Physiology, Pathology, Therapeutics, Pharmacy, Toxicology, and Hygiene." Vol I. Edited by J. L. W. THUDICHUM, M.D. London: Longmans, Green and Co. 1879.

To review a work on the subject of Medical Chemistry, penned by such an eminent authority as Dr. Thudichum is a most difficult task. To differ with the Doctor would be to put yourself to the proof in support of your own views, and thus, instead of issuing a review, a discussion would be opened up in our pages.

Luckily we are, as far as the contents of this first volume is concerned, quite able to agree with Dr. Thudichum's treatment of his subject, and only wish to add that the work appears to be as comprehensive and excellent as his great reputation would lead us to expect.

The scope and interest of the work Dr. Thudichum in his preface thus explains:—

I have the honour of laying before the Medical Profession and the general scientific public the first volume of a new periodical, the principal object of which will be the advancement of the sciences named on its title by means more especially of the chemical method. The several means by which it is hoped to contribute to the attainment of this object will be the publication of original researches to be carried out in physiological, pathological, chemical, and pharmaceutical laboratories in Great Britain and abroad, and the communication and diffusion of the results of the progress of chemistry as far as it relates to medical objects which has been made on fields, and communicated through channels, not commonly accessible to medical readers. In this endeavour it had to be borne in mind some of these results might in their original form be too technical to be readily appreciated, and might therefore admit of some interpretation and adaptation to particular wants. On the other hand it was felt that the lasting value of the publication would be increased by a thoroughly practical treatment of the principal scientific questions of our tim[illegible] including the communication of technical details which may be necessary to enable the reader to control, or the student and inquirer to repeat and extend, the operations of which the data furnished are the result.

Medical science is at present more particularly interested in the solution of the problems concerning the nature of the causes of infectious diseases, and the nature of the processes of diseases engendered in the organism by these causes. These latter act after the manner of ferments, and while some of them are undoubtedly organised self-reproducing parasitical beings, others are supposed to be unorganised or shapeless, and in this respect to resemble the normal ferments of particular organs of living beings. The proximate and final effects of both kinds of disease-causes upon the body are always massively chemical; the ferments decompose materials of the body into substances which either engender increased consumption of oxygen and excessive production of organic heat, or act as poisons upon the nervous and muscular systems; some are eliminated, causing loss of power and material, others are left as useless or hurtful hindrances in organs and tissues. All infectious diseases have therefore at one period or another chemical results, and these are amongst the principal objects of the inquiries proposed to be expounded in these pages.

Although physiology has its own rights as a science quite independently of practical applications, its development thus far is, and in the future probably will be mainly due to its obvious connection with the healing art. It is in this relation that we shall mainly endeavour to illustrate its progress, but without excluding concise philosophical views or instructive generalisations extending to fields of natural history.

The chemical processes of disease can only be measured with the aid of physiological methods, but the attempt to unfold their quality requires also the application of a kind of chemical method which goes beyond that ordinarily employed by natural historians. The application of this method promises to be of great use in the study of disease, as it has taught us already that several zymotic processes have great analogy to forced decompositions of organoplastic substances by merely chemical agencies.

It is intended to give to the pathological experiment due scope, even though it should in some cases not directly or at once lead to any chemical development. The pathic process shows the chemical share of its composition when it has to be counteracted, be it by prevention or antidosis. Even the most modern treatment of wounds relies to a large extent upon chemical agents, and what is commonly termed antiseptic might in a wider and perhaps better sense be termed chemical surgery. The practice of the healing art in all its branches is therefore literally interwoven with chemical principles and problems. To assert these principles, and aid in the solution of these problems, and subsidiarily, to effect the union in a focus of data which by distribution would be weak and inert, are parts of a programme which it is hoped may be found not unworthy of the kind attention and generous support of the Medical Profession.

While hoping to merit this countenance mainly by presenting the researches and observations of others, whose results I shall endeavour to give with due completeness and perspicuity, I shall venture to direct attention from time to time to work more particularly my own, and that in parts where progress has been made possible only by the support and countenance which the Lords of the Privy Council and the Local Government Board have given to my researches by connecting with the medical department of their service.

During a long series of years the results of my work on the field of chemical medicine have been published in various repertories of original information, such as "Reports of the Medical Officer of the Privy Council" 1866 to 1676; "Reports of the Medical Officer of the Local Government Board" 1876 to 1879; "Journal of the Chemical Society" 1860 to 1876; *British Medical Journal* 1864; "Transactions of the Medical Society of London;" Erdmann's "Journal of Practical Chemistry;" Liebig's "Annals of Chemistry;" "Proceedings of the Royal Society;" *Moniteur Scientifique;* "Proceedings of the Royal Bavarian Academy;" *The Lancet*, &c. The fragmentary mode of publication, with the circumstance that I have never hitherto published my results in a collected form, has probably been of disadvantage to me with many readers. And it has facilitated a very unworthy use of my work by certain authors; who being fully aware of the work in the places of original publication, have observed complete silence regarding it, or have sought to set it aside with some frivolous objections, while perhaps at the same time appropriating more or less of its fruits. Both in justice to myself, and in regard for the honest literary interests of science, I have at last felt myself obliged to make distinct public reference to some such proceedings, and the protests which I have had to make in some glaring cases will be recorded in Article XXIII. of this volume.

The explanation of the case is not far to seek. There are professed physiologists in this country and abroad, who though very imperfectly acquainted with either the theory or the practice of chemistry, have nevertheless affected to speak as persons having well-founded convictions on the subject: with their pretended convictions, however, resting on no better basis than the haphazard opinion (*obiter dicta*) of some professed chemist or other, or the conceited and sensational papers which, in chemistry as elsewhere, are written for mere claptrap and without research. I could quote instances by the score, where physiologists acting on that system have reproduced as their own the errors of others while omitting the better knowledge which they ought to have given to their readers.

Among the professed chemists there has sometimes been equal absence of knowledge, but, in such cases, as a rule, more discretion. The acquaintance of the chemists with the physiological, pathological, and medical applications of chemistry has often been most slender; but the chemists have appreciated, better than physiologists could, that discussion in chemistry is eventually an affair of the balance, and they have known that on such discussion they could not openly enter without having first made actual exact researches of their own. Such researches,—researches which do not pay—the gentlemen to whom I refer have not undertaken. Some, nevertheless, men of externally high position, have persistently done all they could, sometimes by silence, sometimes by inuendo, sometimes by obstruction, to thwart the endeavours which others have made to advance medical science by original chemical researches. These men, however challenged, have avoided the light of publicity, and have thus impressed upon their action a character of intrigue and unfair rivalry. With the progress of time this poor policy has reacted upon its authors, whose universal incompetence to judge in medical chemistry is now either notorious or of easy demonstration.

While I have thus been obliged to forewarn the Medical Profession and the general scientific public regarding the origin of sundry kinds of opposition which the present undertaking may perchance have to face, I all the more hope that the true scientific chemist may derive from the perusal of the "Annals of Chemical Medicine" an assured experience to this effect, namely, that the accurate methods of which he holds the formula in his analytical training, and in the talisman of the atomic theory, are essential in medical no less than in abstract chemistry, and that inaccurate methods must not be propounded to the Faculty under the excuse, which hardly admits of serious examination, that they are "good enough for clinical purposes."

In conclusion I venture to hope that the "Annals of Chemical Medicine" will be useful to several classes of readers. To the medical practitioner they will afford on the chemical aspects of the most important questions of the science of which he represents the executive authority; collaterally they will afford information on the most trustworthy methods of diagnosing morbid chemical conditions, and on the significance of these conditions with regard to prognosis and treatment. To the scientific inquirer they will present in turns all the latest data from which he will have to start as a basis, if seeking to enlarge the present information on any one of the subjects within their range.

All contributions of original information, be such the result of observation or experiment, will be as welcome as deductive or inductive meditations, provided only they are based upon the data and principles of actual science. A predilection for a maximum of fact and a minimum of speculation does not exclude the sense of the attractions of theory, in its true meaning, as the very flower and fruit of the slow growth of the body of data. Experience, however, shows that no interpretation of natural phenomena has any lasting value, unless all the essential factors entering into their production are ascertained and appreciated. The accumulation of these data in a form readily accessible to all interested in their use will therefore promote the philosophical development of our science much more than premature generalisations.

With the aid of the list of articles at the beginning, and the alphabetical indices, one of matters, the other of authors, at the end of the volume, the inquirer after information will be fully able to find any general subject or any matter of detail. To facilitate the use of any new terms and symbols, which may be found convenient abbreviations of ideas, I have added a page for their interpretation and definition. The same page will state some synonyms, and thus aid in obviating a confusion which should gradually be abated by the adoption of a uniform nomenclature.

I believe the chemical method to possess vast capabilities for enlarging the domain of pathology and medicine, and for advancing the art of healing disease; and I trust that all who share that hope will aid in its realisation either as contributors, as readers, or as friends.

The above views Dr. Thudichum carries out in the various chapters of the work by treating of—The Chemical Constitution of the Organoplastic Substances, considered with the aid of the Hypothesis of their Amylonide Nature; Ultimate Crystalloid Products of the Chemolysis of Organoplastic Substances, particularly by Caustic Baryta; on the Action and Products of the Starch-Transforming Ferments, Diastas, Ptyalin, Pancreatin, Acids, and various matters derived from Albuminous Substances; the Life and Philosophy of Robert Julius Mayer, Physician to the Town of Heilbronn; on the Colouring Matters in the Shells of the Eggs of Birds—an illustration of chemical diagnosis at a glance, and of the value of abstract chemical researches; on the Organic Acids of the Brain, with special reference to the Nature of the Lactic Acid contained in it; on the Chemical Decomposition of Bile and its Ingredients, with reference to the Theory of the Function of the Liver; Chitin, the Simplest Nitrogenised Organoplastic Amylonide; on Hemisymmetry in the Chemical Constitution of Organoplastic Substances—Hemiprotein and Hemialbumin; Chemolysis of Albumin by fusing Caustic Potash—production of Indol, Skatol, Pyrrol, Phenol, and Butyric Acid; Process and Products of the Putrefaction of Elastin, Mucin, Glutin, Albumin, Hemochrome, and Blood; on the Alkaloids of the Human Urine; the Properties and Metamorphoses of Soluble Albumin; on Infection and the various States of Aggregation of Infectious Matter; Conflicting Views of Contagionists and Anti-Contagionists concerning the Origin of Infection—Diphtheria in Animals; Recent Data and Arguments in favour of and against the Hypothesis of the Living Contagium; on the Specific Alvine Flux of Cholera, with Special Reference to its Inorganic Constituents, with Hints Concerning the Theory of Cholera; Experiments on Animals for Ascertaining the State of Greatest Infectiousness of Fermenting Cholera Poison; Note and Experiments on the Alleged Existence in the Brain of a Body termed "Protagon;" on the Colouring Matters of Bile and of Gall-stones, their Compounds, Derivates, Chemical and Spectroscopical Phenomena; Spermatin, a new Organic Base in Animal Organisms; Chemical Surgery, with special reference to the Antiseptic Pharmacopœia; Historical Retrospect on Earlier, and Critical Consideration of Contemporaneous, Researches on Biliary Pigments.

JORDAN'S TABULATED WEIGHTS.

"Tabulated Weights of Angle Tee Bulb, Round, Square, and Flat, Iron and Steel, and other Information for the Use of Naval Architects and Shipbuilders." By Chas. H. Jordan, M.J.N.A., Surveyor to the Underwriters' Registry for Iron Vessels. London: E. and F. N. Spon, 46, Charing-cross. 1879.

This little work, of which this is the third edition, has been revised and enlarged, and several new tables added; and looking at the introduction of mild steel in the construction of ships the author has thoughtfully added a series of tables of weight of this material. Other new matter has been introduced, and altogether those for whom the tables are specially designed will find this last edition of much service.

MILLAR'S DESCRIPTIVE GEOMETRY.

"Elements of Descriptive Geometry." By J. B. Millar. Macmillan and Co.

This treatise is a clear and comprehensive exposition of the principles and practice of descriptive geometry (a branch of mechanical drawing) teaches how to project figures orthogonally on horizontal and vertical planes, and, conversely, from the given projections to draw inferences as to the figures themselves. Its first chapter is on solid geometry, containing many theorems bearing directly on the main subject. Other portions of the work explain the principles and methods of descriptive geometry, and illustrating them by the solution of problems, the regular construction is supplemented by a second figure consisting of a perspective drawing of the thing to be projected and its projections, intended to aid the student in forming a mental picture of the case. The next three chapters treat of the projections of plane and solid figures, trihedral angles, curved surfaces, their intersections, and their tangent planes are given, and the last chapter treats of "axometric projection,"—*i.e.*, orthogonal projection on a plane which is not one of the three principal planes.

ADSETT'S IMPROVEMENTS IN GUNS.

These improvements consist substantially of arrangements whereby guns cannot be opened without placing the locks at full cock. Also, by these improvements, the gun is made to indicate when cocked and loaded. Each lock comprises a lock plate, tumbler, and cam (the said cam being fastened or connected to the tumbler), a bridle, sear, and sear-spring, spiral spring, and striker bar. Working on the outside of the lock-plate is an indicator in connection with the tumbler, to indicate when the gun is cocked. This is effected by a lifter, which, as the gun is opened, lifts the cock or cocks and tumblers to full cock, at the same time actuating the indicator, thus showing when the gun is cocked the cartridge forcing the striker back, raising an indicator, and showing that the gun is loaded. The gun is placed in working order by first lifting the tumblers by the lever, thus drawing back the striker bar by means of the cam (to which the spring is connected by the striker bar) to position to full cock. To prevent the gas, after the explosion of the cartridge, from entering the lock of the gun, a covering or box is used in which the spring works. A safety bolt may be used with these arrangements, which locks the whole action of the gun. This safety bolt can be removed when the person about to fire has the gun in position, without taking his aim off, and without removing the gun from the shoulder, by moving the bolt with the thumb. This safety bolt may, it is evident, be dispensed with if required.

The inventor and patentee is J. Adsett, of Canterbury.

ELECTRICITY AS A MOTIVE POWER.

At the British Association, Prof. W. E. Ayrton delivered a lecture on "Electricity as a Motive Power," and interesting illustrations were given, including machinery in motion, driven by power derived from a distance.

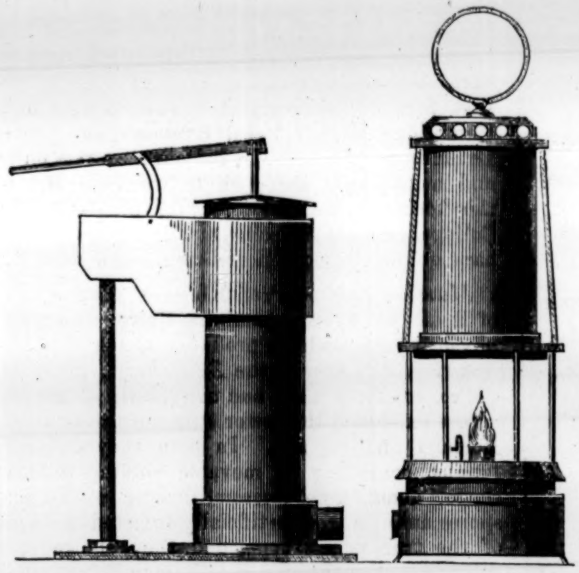
The lecturer stated that in any generation of electricity there was a certain property called the eltro-motive force, which meant its tendency to send a current, and which was analogous with the head of water in a reservoir, inasmuch as the product of the quantity of electricity flowing per second, multiplied by this electro-motive force, measured the amount of energy furnished by the generator per second, and which could be reproduced as motive power elsewhere if there were no friction. The loss of energy due to electrical friction in the wires was equal to the square of the current flowing per second multiplied by what was called the resistance of the wire—a number depending on the length, the diameter of the wire, the material of which it was made, and the temperature. The most efficient way to transfer energy electrically was to use a generator producing a high electro-motive force and a motor producing a return high electro-motive force, and by so doing the waste of power in the transmission ought, he considered, to be able to be diminished with the best existing dynamo-electric machines to about 30 per cent. It would be impossible to increase indefinitely the speed of revolution of the cylinder of an induction machine, since, apart from mere mechanical friction, the iron constituting the core of the revolving part had to be magnetised and demagnetised very rapidly as it revolved. Now, there was a physical limit to the speed with which this could be done, and, in addition, this rapid change of magnetism heated the iron very much. But experiment showed that at the ordinary speed of revolution of dynamo-electro machines—700 turns per minute—the electro-motive force was proportional to the speed. They were, therefore, very far yet from the limit of speed. Consequently it would be well for the transmission of power to attempt first a considerable increase of speed in the generator combined with so light a load on the motor, that its speed would be also very high. When this began to fail as larger and larger amounts of power were transmitted, then they might begin increasing the amount of wire on the revolving coils of each; but this, of course, had the objection that the loss of power from a given current would then become somewhat larger. As they had seen that by the use of electricity properly employed the waste of power in transmission could be reduced for any distance to about 30 per cent. of the whole power absorbed at the generator, it followed that the employment of steam engines of vast size at points outside Sheffield would be by far the most economical mode of extracting the energy out of coal. For it was at least four times as expensive to produce power with a small steam engine as with a large one; therefore, including the waste of power in electric transmission, the cost of production of power in small workshops would be littte more than one third as dear as if small steam engines were used, and similarly the waste of power in any large mill or factory in its transmission from the large steam engine at its base to all the floors and machines on each floor would be very much diminished. But they would say that in advocating the employment of electricity he was advocating a total change in our mode of producing and transmitting power. Was the probable gain worth the expense of the necessary change? To answer this question they must consider what would be the probable minimum annual gain by the proposed change in Sheffield alone. In making this calculation they must remember that not only could electricity produce motive power, but also heat and light, and electric heating and lighting had this great advantage that no chimneys were required. For example, with the electric current sent to that hall from Messrs. Walker and Hall's works, he could heat a long coil of iron wire white hot, so that when put into a vessel of water the water in a short time would begin to boil. Various calculations had been made as to the relative cost of lighting by burning coal to produce gas, or by burning coal to work dynamo machines for producing electric currents, and it seemed to be pretty certain that if a large amount of light be required in one place, the electric light was at least twenty times as cheap as coal. Sir William Thomson, the eminent electrician, went so far as to say that it might be made 133 times as cheap. And certainly that there was a great saving in expense in electric lighting was seen from the actual result obtained at the Albert Hall, London, which was an example, and perhaps the only example, in connection with electric lighting where the science of putting a brilliant light high up had been allowed to ride over the precedent of putting a number of feeble glimmers all over a building. The actual cost, including labour of men, allowance for wear and tear of machinery, &c., was only one-third of that of the former inferior gas lights, and thus a saving of about 30s. an hour had been effected. Lighting streets by electricity had not been so successful economically, for the simple reason that instead of giving a large bright light at a considerable height reflected downwards, as in the Albert Hall, London, English conservatism had prevented the authorities from grasping the possibility of using for street illumination anything differing from an ordinary iron lamp post. But there could be little doubt that if a few large electric lights high up were used for street illumination the same sort of result as has been obtained at the Albert Hall would be arrived at. The cost of using gas in Sheffield for lighting large halls, such as the one they were now in, factories, and the streets, could be halved if electric currents, generated by water engines worked by hill streams, as well as by very large steam engines, were substituted for gas. It was not necessary for him to tell them how he proposed to employ the electric light to illuminate private rooms, if only he could get people to throw away the notion that to light a room they must have something with a globe on it, like an oil lamp; nor was it necessary for him to remind them that by whitewashing the walls—yes, by white-washing even the very machines themselves —in some of the Paris factories, the supposed strong shadows cast by the electric light had been less than the strong shadows cast by another bright light, one that we not only put up with, but one that from force of habit we were tolerably contented with, namely, the sun. At present he was concerned with the pounds, shillings, and pence question, which had more than usual weight in these days of slack trade. Assuming that the cost of gas for lighting the large buildings, factories, and the streets of Sheffield could be halved, also that where it was used for heating purposes the expense could also be halved by substituting electric currents generated by very large steam engines at certain points, and by turbines driven by falling water out of the town; then they would save per year about £45,000. Supposing, also, that the cost of producing motive power could in the same way also be halved, this represented an annual saving of something like £60,000. In reality, he believed this last economy would be larger, since not only could power be produced so much more economically than by small steam engines or even by a large engine when a large proportion of its power was, as now, wasted in driving the shafting alone in their factories; but, in addition, much hand work could be economically replaced by machine work. And, lastly, supposing the consumption of coal in Sheffield for heating their metals and for heating their houses could also be halved, then there was another saving of about £300,000 a year; or, altogether, the annual saving that might be produced in this town alone, by substituting electricity for coal, would be something like the large sum of £400,000.

Last year two French engineers, MM. Chretien and Felix, at Sermaize (Marne), actually ploughed fields by electricity, the electric current being produced by two dynamo-electric machines of a form invented by M. Gramme. These machines were usually worked with a steam engine at some convenient place three or four hundred yards away in an adjoining road, and the electro-motors were also two Gramme machines, one on each side of the field, with their coils revolving of course backwards. Through one of these the electric current was sent alternately, so that motion was given to one or other of two large windlasses, one on each of the waggons containing the electro-motors. In this way the plough, which could be used going in either direction, was first pulled across the field, making a furrow, and then back again, making another parallel furrow. If electricity were produced in large quantities at certain centres, then one difficulty that would of course be met with would be that of distributing it properly, since, just as in the case of water or gas, if a large branch pipe in a main be suddenly opened then the supply going on to the other branch pipes in the same main would be diminished, a result causing serious inconvenience in the case of electric lighting. But just as automatic governors had been devised for water and gas to keep the supply constant so automatic "electric current regulators" had been devised by M. Hospitalier and by Dr. Siemens to keep the current constant. One of those invented by Dr. Siemens was on the table before him, and the general principle of its construction was easily understood. As the current passed through the regulator it heated a very thin ribbon of steel, which consequently expanded. The effect of this expansion was to introduce coils of wire into the circuit, the extra resistance of which diminished the strength of the current. Consequently the stronger the current the more was it automatically resisted, and the weaker it became the less was it resisted, and so it remained practically constant at any desired strength for which the regulator was previously adjusted. In conclusion, the lecturer said there was a time when "not only in the villages around old Sheffield," so said the historian of Hallamshire, "were the file makers' shops or the smithy to be seen, with the apprentices at work; but even on the hillside in the open country, at the end of the barn, would be the cutler's shed, while in the valley below, by the river, was the grinding stone ready to sharpen the tools that had been manufactured." And why not now? Why should not that mountain air that had given the workmen of Hallamshire in past times their sinew, their independence, blow over their grindstone now? Why should not division of labour be carried to its end, and power brought to them instead of them to the power? Let them hope, then, that in the next century electricity might undo whatever harm steam during the last century might have done, and that the future workman of Sheffield would, instead of breathing the necessarily impure air of crowded factories, find himself again at the hill side, but with electric energy laid on at his command.

An oil press hoop with bevelled shoulder and moveable bevelled perforated bottom, has been patented by Mr. Wm. V. M'Kenzie, of Rahway, N. J.

A NEW FORM OF MINERS' SAFETY LAMP.

Colliery explosions are known to have resulted in loss of life and property as early as the year 1710, and year by year have gradually increased. Notwithstanding the many inventions and improvements on safety lamps, and the scientific achievements in the ventilation of our mines, producing 200,000 cubic feet of air per minute, colliery explosions are raging to a fearful extent, slaughtering honest-hearted British workmen, and filling our mining districts with widows and orphans. Our miners are excavating coal at the rate of 134 million tons per year, and, seeing that the wealth of our country depends on her mineral produce, no question ought so much to arouse our nation and occupy the minds of our legislators as that of colliery disasters. During the last 23 years not less than 2,404,917,538 tons of coal have been raised from our mines in Great Britain at the sacrifice of 5,556 poor miners by explosions of fire damp. But taking the last three years we have a rapid increase; in the year 1876 we have 47 explosions, resulting in the loss of 99 lives; in 1877—explosions 49, loss of lives 345; 1878—explosions 31, loss of lives 586; and in the present year a fearful number is already scored on. But the total loss of life from various causes in the year 1878 is 1,413 as against 1,208 for the year 1877. Whilst coal has to be excavated from our mines the liability of explosions can never be annihilated where naked lights or dangerous lamps are in use. The inventor having had 27 years experience in fiery mines and the use of safety lamps, and being well acquainted with the many evils, also the various ways that the lamps are tampered with, has long seen the need of a better lamp and safer lock, and tried in every possible way to overcome those evils as far as material will allow.



The advantages are as follows:—It is a good light; it is sensitive to gas; a steady blaze in the strongest currents of air; it is impossible to draw or propel the flame through the lamp or explode it. It extinguishes itself instantly when in contact with explosive gas; the lock is self acting, and you cannot possibly unlock it without the pneumatic apparatus. The economy is a great consideration in locking, unlocking, cleaning, and repairs, and so practically is it constructed that its most tender and vital parts are concealed from risk of tampering and danger. The inventor and patentee is W. Purdy, Eastwood, Nottingham.

Dr. Bernhard Stark, Professor of Archæology at the University of Heidelberg, died on the 12th inst. after a short illness.

MART AND BRADLEY'S IMPROVED HEATER.

This invention consists of arrangements for heating or cooling water, or other liquids, and conveying and delivering same so heated or cooled. When the water, or other liquid heated, is to be delivered, the water, or liquid, is conveyed as heated by a pipe from the boiler or vessel in which it is heated, one end being connected to the lower part of the boiler, and the other to the upper part. The water being heated flows from the upper outlet, and circulates through a pipe, descends to the bottom of the boiler, and enters again by the lower inlet. An outlet is provided at the top, or highest part of the pipe (which is preferably arched) for the delivery of the hot water or liquid. This outlet also serves for the escape of steam and expanded water. Below the outlet of the pipe, or in other convenient position, is situated a table or stand, provided with a grating, on which a glass or any vessel is placed to receive the hot water or liquid. This stand or table communicates by a pipe, stem, shaft, or spindle, to a four-way cock, so that by turning the table or stand partly round it actuates the plug of the cock, turning on the cold water to the boiler, which enters by the lower inlet, or a separate inlet, and the supply of gas to the burners. A small gas burner is used independently of the main burner or burners in order to ignite the said burners when turned on by the said table, or lever, or handle, and this independent burner will also assist in keeping up heat. A pipe, which forms the stem of the table, and a continuation of the plug of the four-way cock is hollow, and terminates in a gland box or other suitable arrangement made water-tight by packing; this drains away the drippings from the delivery outlet of the pipe. These arrangements can also be used for heating and conveying water so heated for baths, lavatories, and such like purposes. For delivering water or other liquid, cooled instead of heated, the boiler is dispensed with, and a chamber having therein a coiled pipe or tube substituted. This chamber is filled with ice around the coil, and the water passing through the coil becomes, in its passage, cooled, and same is conveyed and delivered so cooled as before described. It is made of metal, or other suitable material, having a number of tubes running through it. These tubes, which may be round, square, or polygonal, and either straight or tapered, are placed in the vessel as close together as may be in order to present the largest amount of heating surface to the quantity of water passing through. The water issuing into the boiler at the lowest part passes upwards and circulates round and outside of the tubes, and is heated. The boilers, or vessels, are placed over a gas burner, or burners, the heated products of combustion passing upwards through the series of tubes.

The inventors and patentees are Messrs. Mart and Bradley, of York-street, S.E.

CADETT'S NEW MICROPHONIC ARRANGEMENTS.

This invention consists of a transmitter to be used specially in connection with telephonic arrangements whereby an improved result is obtained when used with telephonic or other receiver or receivers.

To a board or boards, diaphragm or diaphragms, or surface or surfaces, made of any suitable material, I fix or place, on one or both sides, a set or sets of bearing pieces, blocks, or rods, made of carbon, or other suitable material. To these bearing pieces, blocks, or rods, are fitted rods, or pieces of carbon, or other suitable conducting material, forming a series, or several series, of conductors. Wires or other conductors are arranged so as to allow of suitably connecting the various bearing pieces, blocks, or rods, as may be required, into a series, or several series, coupled together, so as to have suitable resistance, so disposed that the arrangements can be employed to the best effect with the battery, or other power employed, and the resistance of telephonic or other receiver or receivers, line wires, and so forth.

The above arrangements are connected with regard to the line wire, or wires, in the usual and well-known manner for electric telephony, In use the sound to be reproduced, or conveyed, is produced at a suitable distance from the board, or boards, diaphragm, or diaphragms, or surface, or surfaces, the result being that the vibrations cause variations in the resistance of the conducting power of the instrument made according to the invention, whereby currents of electricity are made to pass in waves, or otherwise, proportionally and according to the sound produced, such currents being used with regard to the receiver, or receivers, or telephone, in the usual manner. The connecting and coupling arrangements before described permit of the arrangements being made to suit the electric power employed, and also the resistance of the line wire, telephone, or other receiver, or receivers, and so forth.

The inventor and patentee is J. Cadett, of Camberwell-grove.

SHARP'S IMPROVED CHIMNEY TOP.

This invention has for its object the prevention of what are commonly called smoky chimneys. The arrangement may also be applied as a ventilating shaft, and to the prevention of down draughts in chimneys, and ventilating shafts. On the top of the shaft is placed a half circular, or other suitable shaped dome, the mouth of which is sometimes preferred to decrease in area to regulate the draught. The bottom edge of dome is secured to the shaft by a ring, collar, or other suitable shape, or, arrangements, which forms a covered surface underneath; this makes the dome a solid substance, or connection, to the shaft. Above the mouth, at the top, a suitable covering such as are in ordinary use, is placed, and supports, which are secured to the shaft below the dome.

The invention is so arranged that when the wind is blowing upwards or downwards the foul air immediately rushes up the shaft, thus securing a continuous powerful upward current, and no down draught. By the construction of this chimney-top it can be fixed in all situations, above or below roofs, and at any angle, and will work as effectually in whatever angle it is placed. It will not interfere with the effectual cleaning of the shaft. The inventor and patentee is C. H. Sharp, of the Hop Exchange.

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President, SIR ANTONIO BRADY.

THE SESSION 1879—1880

Is to commence with the Opening Meeting on Thursday, 27th November, at 4.30 p.m.

Members' Meetings at 8.15 p.m. on Thursdays, December 11th; January 8th and 22nd; February 5th and 26th March 11th and 25th; April 8th and 22nd; May 6th; and June 3rd.

Annual General Meeting, Thursday, May 20th, at 4 p.m., unless otherwise arranged.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

The Institute being now out of Session, no meetings have been held.

Monthly Notices.

"*Kind Words*," the well-known serial, published by the Sunday School Union, is announced to be brought out as a penny weekly for boys and girls under the title of "Young England." The first number is to be ready before Christmas.

The Royal Society have once more announced that applications for grants from the Government Fund of £4,000 for the promotion of scientific research must be sent in before the end of the present year. Within the first two months of 1880 the discussion of the applications and conferring of the grants will take place, and the fourth of the five years originally proposed by the Treasury as the experimental term will have arrived.

High Class Education for Ladies.—The following notes on the facilities accorded to ladies at Cambridge for studying science may be interesting:—Prof. Liveing's University lectures on chemistry will be supplemented, in the Cambridge Lectures to Women, by Mr. Main's practical course at Newnham Hall new laboratory, on Mondays, Wednesdays, and Fridays this term. Mr. Shaw will conduct a course of experimental physics for the first part of the Natural Sciences Tripos and Group E of the Cambridge Higher Local Examination. Some of Dr. Foster's, Dr. Humphry's, and Mr. Balfour's courses on animal physiology and morphology are open to women. Mr. Vines will lecture this term on the physiology of plants in the hall at Christ's College, and these lectures will be open to those women who have obtained special permission.—*Athenæum.*

Marsh Fevers.—Prof. Klebs, of Prague, and Prof. Tommasi, of Rome, have been examining during the past spring into the physical poison which produces marsh fever. The former has, in a recent number of the *Zeitschrift*, given full particulars of the experiments made and the results obtained. These investigators examined the lower strata of the atmosphere of the Agro Romano and its soil. In both they discovered a microscopic fungus, consisting of movable shining spores of a long oval shape, about nine micromillimètre in diameter. With these spores animals were artificially infected with intermittent fever of the true marsh type, and they showed precisely the same enlargement of the spleen as human beings who have caught the fever in the ordinary way. Tommasi and Klebs have given this fungus the name of *Bacillus malariæ*, as it grows into the shape of small reeds.

Mr. John Miers, F.R.S., the well-known botanist, died on the 17th inst. at the advanced age of ninety years.

Lady Lubbock, we regret to hear, died after a short illness. Like her eminent husband she was extremely fond of science, and her attainments were very considerable. Her loss will be mourned by all who knew her.

Messrs. Sonnenschein and Allen have in preparation a series of manuals to be entitled "Industrial Geography Primers," intended for the use of schools. Mr. G. Phillips Bevan, F.G.S., is to be the editor of the series, and the first little volume, "Great Britain and Ireland," will appear in a few weeks. The whole series will comprise about fifteen volumes, among which will be the British Isles, France, Prussia, Austria, Hungary, Spain, Portugal, Italy and Sicily, Russia, Norway, Sweden, and Denmark, Belgium, Holland, America (in three volumes), the British Colonies, &c.

Profs. Armstrong and Ayrton have been appointed by the City and Guilds Institute as the lecturers on technical science in their school.

Allotropic Oxygen—ozone—as a bleaching agent, has been employed with success by M. D. Brochocki, a French chemist. This product is now being manufactured on a large scale in this country, at Warrington, and in London.

Messrs. Crosby Lockwood and Co. announce the publication of treatises on "Metalliferous Minerals and Mining," by Mr. D. C. Davies; "On Woodworking Machinery," by Mr. Powis Bale; "On the Construction of Large Tunnel Shafts," by Mr. J. H. Watson Buck; an "Aid to Survey Practice," by Mr. L. D'A. Jackson; "A Handbook of Electroplating," by Mr. J. W. Urquhart; and "The Plant Propagator and Tree Planter: a Practical Manual," by Mr. Samuel Wood.

M. Raoult states, in the *Proceedings* of the French Physical Sotiety, that the porous nickel, which is employed as the magnetic electrode in the decomposition of acidulated water, absorbs large quantities of hydrogen gas.

The Scientific Review
AND
SCIENTIFIC AND LITERARY REVIEW,
INCORPORATING THE "JOURNAL OF THE INVENTORS' INSTITUTE."

NOVEMBER, 1879.

RELIEF OF TRADE DEPRESSION BY INVENTION.

Some mitigation of the symptoms of the chronic state of Trade Depression that has prevailed for several years past has, it appears, set in, for which it is to be hoped everyone will be duly thankful. However, as far as we are concerned, thankfulness will not give us rest from exertion in behalf of a still larger measure of relief. Not that we rank amongst those who think that in industrial matters, or in any other, the inhabitants of these islands should be everybody, and all the rest of the world nobody. Impressed with this notion of the necessity for working onwards and upwards, we desire to impress others, to which end we think nothing could be better than to place in prominence a case in which trade depression has produced very direful results. The story of the rise and progress of the Cleveland district is now more or less familiar to everyone who takes the smallest pains to make himself acquainted with current industrial annals. Fiction scarcely supplies anything more strange or striking than the transformation of the once marshy, isolated, and dismal swamp where Middlesborough now stands into a flourishing community of 60,000 souls, instinct with such a spirit of enterprise and energy as the most forward of American cities might well envy. For many years the progress of Cleveland was unchecked. Furnace after furnace, mill after mill, forge after forge, were erected in response to a steadily growing and strictly legitimate demand for the special commodities that it was the business of Cleveland to produce. An unprecedented career of progress was temporarily arrested in 1866, when the commercial world was shaken to its foundations; but the elastic tendencies of the iron trade enabled this shock to be got over without serious inconvenience. A protracted strike of ironworkers involved the district in much greater trouble than any merely external disasters; and, that settled, the iron trade exhibited its remarkable powers of recovery, and extended itself with greater strides than ever. Between 1868 and 1874 the progress of the Cleveland district was without parallel. The production of pig iron was advanced from 1,233,000 tons to over two million tons, and the finished iron trade made concurrent and corresponding progress. But since 1874, says the *Times*, from which we quote, the history of Cleveland has been almost as doleful as it formerly was auspicious. Ruin, bankruptcy, collapse, starvation, are terms that have been freely used, and not altogether inappropriately, to describe the condition of things. Of the 165 blast furnaces in the district, 86 were either damped down or blown out. The metropolis of iron, it may be said to have placed itself entirely at the mercy of that industry. By the iron trade it had risen, and with the iron trade it was doomed to fall to a greater extent than localities that were compelled, unlike Cleveland, by the very poverty of their natural resources, to furnish themselves with diversified means of employment. For many years Cleveland attracted labour from almost every town and county in England by the premium of high wages and constant employment. Its mines and its furnaces were manned by the most motley crews, but the agricultural labourer was predominant. In the present condition of agriculture, the men who had transferred themselves to the ironworks and mines cannot return to the plough; and they have been compelled, accordingly, to beg or starve, or, what is to the majority worse and less tolerable than either, to receive the workhouse dole. The *Times* goes on to state that there has been a revival of trade, though this has not been of a very striking character, and in its usual style of reliance upon the ordinary rules of political economy, seeks for comfort in the fact that steel rails are being made at Eston from Cleveland iron, and if this can be done with uniform results, on a satisfactory commercial scale, there need be little doubt about the future. In such an event, the vast resources of Cleveland would soon enable it to take a leading, if not a pre-eminent, position in the steel trade. But in no case will it be likely to employ as many hands as it has hitherto done, relatively to the extent of its production, nor will the wages paid under the new order of things be as high as those of the past. It was fit and proper that the laborious and irksome work of the puddler and roller should command the highest wages paid to purely manual labour. But the steel manufacture demands a greatly inferior degree of skill and a diminished expenditure of muscle and energy. There is, therefore, less inducement to remain in the trade, and the prospects that Cleveland offers to labour will not in the future be much higher, if any, than those held out by other districts. So far as capital is concerned, the relief that has been so anxiously looked for will no doubt, under any circumstances, be realised slowly, and probably it may come more from the growth of collateral industries than from any other direction. The district, indeed, has become so impoverished that it will not be easy for it to take full advantage of a revival, even when that event has come to pass. But the natural resources of Cleveland can hardly fail, in spite of the reverses of the last few years, to command again the attention and woo the confidence of capitalists. Placed as it is on the borders of the most prolific coal-field in the world, possessing inexhaustible stores of iron ore, and within easy access of the limestone used as a flux, it is not limited to these advantages, great though they be. It is situated on a river that has rare facilities for chemical, shipbuilding, and other industries, which have only as yet been localised on a very limited scale, and it has enormous beds of rock-salt underlying a great part of its area. With all this in its favour, they must be desponding indeed who despair of a better future for so hopeful and so deserving a district. Our comment on all this is that the inventor and inventions need greater encouragement than is offered to them in the three kingdoms, and that such encouragement would soon cause a vast change for the better in every branch of trade and industry. To our mind our statesmen and legislators would be far better employed in setting our Patent Law on a right basis than in dancing after Will o' the Wisps in Afghanistan and Zululand.

Proceedings of Societies.

QUEKETT MICROSCOPICAL.

SEPT. 26TH.—Dr. T. S. Cobbold, President, in the chair. Three new members were elected, and Mr. H. F. Hailes was elected joint secretary of the Society. The President delivered his opening address. A new and elaborately constructed machine for cutting sections of hard tissues was exhibited and described by Dr. Matthews. Mr. J. J. Hunter also exhibited a simple form of section cutter for soft tissues.

ENTOMOLOGICAL SOCIETY.

OCT. 1ST.—Sir J. Lubbock, Bart., President, in the chair. The President alluded to the loss which the Society had sustained by the death of Mr. W. W. Saunders, a former President of the Society, and announced that the Council had accepted the responsibility of awarding two prizes, offered by Lord Walsingham and other gentlemen, for the best and most complete life-histories of *Sclerostoma syngamus*, Dies., and *Strongylus pergracilis*, Cob., supposed to produce the so-called "gapes" in poultry and other birds, and also the grouse disease. Messrs. Stainton and McLachlan both objected to the Society dealing with subjects relating to the Entozoa, which could in no case be considered as entomology, for the study of which the Society was founded, and considered that the matter would have been more properly placed in the hands of the Linnean or Zoological Societies. Mr. P. H. Gosse was elected an ordinary member. Mr. McLachlan exhibited specimens of the hemipterous insect *Anthocoris nemorum*, reported to be doing great damage to hops growing in the neighbourhood of Canterbury, but the exhibitor suggested that it was on the hops in search of Aphides or other small insects, and therefore beneficial to the hop-grower. He also exhibited examples of the larvæ of one of the Embidæ found by Mr. Wood Mason at Jubbulpore. Mr. McLachlan further called attention to the sculptured stones on the shores of Lake Leman, previously referred to, and considered by Prof. Forel to be due to the action of trichopterous larvæ. From a recent examination of similar stones on the shores of Lake Neuchâtel, Mr. McLachlan inclined to the opinion that the markings were caused by mollusca. Mr. Pascoe exhibited a specimen of a species of the Acridiidæ remarkable for its aquatic habits, and which was found in some numbers on the surface of a pool near Para. The Rev. A. E. Eaton exhibited larvæ, pupæ, and cases of species of Hydroptila (restricted), collected in the neighbourhood of the Haute Savoie, describing their habits, and referring to a case of synonymy to which they had given rise. Sir J. Lubbock exhibited a specimen of *Orchesella rufescens* taken in Kent, being a species of Collembola new to Britain. Mr. E. Boscher exhibited a coloured drawing showing the extreme forms of two varieties of the caterpillar of *Smerinthus ocellatus*, and remarked on their food-plants and habits. The following papers were either read or communicated:—"Descriptions of Phytophagous Coleoptera," by Mr. J. S. Baly; "Descriptions of New Sphingidæ," by Mr. A. G. Butler; and "On the Affinity of the Genus Polyctenes, West., with Description of a New Species," by Mr. C. Waterhouse.

MICROSCOPICAL SOCIETY.

OCT. 8TH.—Dr. Beale, President, in the chair. Prof. Duncan and four other gentlemen were elected Fellows. Mr. J. Beck read a paper "On the Structure of the Scale of a Species of Mormo"; Mr. Gilbert, "On the Morphology of Vegetable Tissues;" and Dr. Stolterforth, "On a New Species of the Genus Eucampia." In the discussion on the papers the President, Dr. Edmunds, Messrs. Stewart, Beck, Gilburt, and Crisp took part. Several pieces of apparatus were exhibited, slides by the authors of the papers read and by Mr. Ward and Mr. Guimaraens, and *Leptodora hyalina* by Mr. Bolton.

NUMISMATIC SOCIETY.

OCT. 16TH.—J. Evans, Esq., D.C.L., President, in the chair. Mr. E. C. Krumbholz was elected a member. Mr. Evans exhibited an unpublished variety of the gold crown of Henry VIII. *Obv.* HENRIC' . D' . G' . RVTILANL . ROSA . SINE S; mint-mark, an arrow; a crowned shield with the arms of France and England, on either side H. R. crowned. *Rev.* DEI . GRA' . AGL' . FRA' . Z . HIB' . REX, a rose crowned between H. and R. crowned. The coin, Mr. Evans thought, was of the last year of Henry VIII., the legend being entirely in Roman letters, and the gold apparently of somewhat base alloy. The principal peculiarity consisted in the name of the king being on the side with the shield, and not on that with the rose. Mr. Copp exhibited proofs in gold of the copper coinage—penny, halfpenny, and farthing—of 1861. Mr. Frentzel exhibited a farthing of Charles II., 1673, reading CAROLVS A CAROLA (*sic*); also specimens of the copper coinage of Cyprus under British rule, 1879, and of the new copper coinage of Jersey, 1877, consisting of 1-12th, 1-24th, and 1-48th of a shilling, instead of 1-13th, 1-26th, and 1·52nd of a shilling. Mr. Thomas communicated a paper "On the Indian Swastica or Mystic Cross," a symbol frequently occurring on coins as well as other ancient monuments. After giving an account of the various representations of the sun in Asia, Mr. Thomas declared his belief that the swastika, as well af the triquetra which occurs on coins of Lycia and Sicily, had a solar reference, the special meaning of the symbol being to indicate the rolling or circular motion attributed by the ancients to the sun. In the course of his paper Mr. Thomas adduced the decorations of the whorls of terra-cotta brought from Troy by Dr. Schliemann, and explained their patterns on the principles of solar reference. Papers were also communicated by Mr. Henfrey on some small errors contained in Mr. Kenyon's new edition of Hawkins's work, and by Dr. Aquilla Smith "On Irish Coins of Henry VIII."

NEW SHAKESPEARE.

OCT. 17TH.—Mr. Furnivall, Director, in the chair. Four new members were announced. The papers read were by Mr. J. O. Halliwell-Phillipps, contending that the "Midsummer Night's Dream" was not written till 1596 or after; by Mr. Overend, of the Public Record Office, on a Bill before Cardinal Wolsey in 1528-9, in which George Maller, glazier and trainer of players for Henry VIII., complained that his pupil Thomas Arthur, tailor, had, after seven weeks' training, taken away three of his fellow covenanted servants under Maller, and gone acting about the provinces, whereby they had made £30 or more, which they ought to have paid to Maller, as their master, but instead thereof Arthur had wrongfully brought an action against Maller; and by Mr. H. Beighton "On the Spirit Creations of Shakespeare, his Fairies, and Witches," tracing the development of his treatment of them in his early, middle, and last periods.

Mr. Edwin D. Finch, of Stanton, Mich., has devised an improved mechanical telephone, in which the vibrations of a diaphragm are transmitted by a cord or wire to a receiving diaphragm at a distance; and the invention consists in novel features, whereby the vibrations are concentrated upon the line and false vibrations prevented; also, in means for adjusting the tension of the line and diaphragms, and relieving the diaphragms of tension when not in use.

READING AT SEVEN AND A HALF MILES DISTANCE FROM THE ELECTRIC CANDLE.

ON the evening of July 12th the Maxim electric light was put in operation on the tower of the Grand Union Hotel, Saratoga Springs, N.Y., with a view to test the extent of its illuminating power. An open parabolic reflector was used—no lenses—and care was taken by Mr. Maxim to set the points of the carbons a little at one side of each other, and to adjust them to the exact focus of the reflector. When this was fairly accomplished the light was turned towards a spot in Ballston Spa, New York, 7½ miles distant, where, by previous arrangement, a group of several hundred persons were assembled to witness the experiment. So powerful was the light, so accurate the focusing and alignment, that the designated place in Ballston was instantly illuminated so that ordinary print could be read, the time seen on watches, &c. The night was clear, still and dark. The experiment was made at 9.30 p.m. This is believed to be the greatest distance at which illumination of equal degree has been accomplished. Mr. H. S. Maxim furnishes the above particulars.

A NEW FLUORESCENT BODY.

ACCORDING to the *Journal of the Chemical Society*, C. O. Harz has discovered a new fluorescent body in *spergulin*. This product occurs in the seed coverings of the caryophyllaceous plants, *Spergula vulgaris* and *S. maxima* (Anglice "Spurrey.") It is produced at the time when the seeds blacken and are nearly ripe. Spergulin is very soluble in absolute and aqueous alcohol. Viewed by transmitted light the solution appears nearly colourless, with a shade of olive green; by reflected light it exhibits a dark blue fluorescence. It has not yet been obtained in the form of crystals. It is very soluble in methylic alcohol, less so in amylic alcohol, and scarcely soluble in ether or petroleum. Concentrated sulphuric acid dissolves it, forming a dark blue liquid. The fluorescence of an alcoholic solution of spergulin is maintained for more than a year if the liquid be kept in darkness, but is rapidly destroyed by the action of direct sunlight, and more slowly by that of diffused light. Small quantities of caustic alkalies or alkaline carbonates, added to an alcoholic solution of spergulin, transform it into an emerald green fluorescent body; and basic lead acetate produces a precipitate. The new compound contains 6185 per cent. of carbon, 7·05 of hydrogen, and 31·8 of oxygen. It appears to be related to chlorophyl, and is probably closely allied to phyllocyanin. An alcoholic solution of the product showed strong absorption, almost entirely in the violet; and in this respect differs considerably from chlorophyl, phyllocyanin, and phylloxanthin. Mr. Harz is disposed to regard spergulin as a feeble acid, the acid salts of which, as well as the acid itself, exhibit blue fluorescence, the neutral salts exhibit green fluorescence, and the basic salts are destitute of fluorescent properties.

URALIUM: A NEW METAL.

As far back as 1869 the author, A. Gayard (a correspondent of the *Scientific American*), discovered this metal in commercial platinum obtained from Russian ores. Next to silver it is the whitest metal known; its malleability is as great as that of the purest platinum, but its ductility is much greater, and it is almost as soft as lead. Its melting point lies near to that of platinum, and it is not volatile. Its specific gravity =20·25, and its molecular volume, like those of osmium, platinum, and palladium, is 6·25. Its atomic weight has been 187·25. In its chemical properties it is difficult to distinguish from platinum.

Correspondence.

PROOFS OF POSTING.

TO THE EDITOR OF THE SCIENTIFIC AND LITERARY REVIEW.

SIR,—The introduction of posting proofs as an adjunct to the Post Office has been urged upon successive governments from 1865.

The *Times* has, by its recent leader, taken the matter up to enlighten its readers as to the objects and intentions of the scheme. If it meet with your approval—and I send you a similar pamphlet explaining the system—I feel sure you will not hesitate to advocate a plan which only requires to be properly ventilated through the columns of the most influential of the public press to ensure for it the attention it must ultimately obtain from the administration. Either as a review of the *brochure*, a leading article, or in whatever form you consider it, it will interest and be appreciated by your own numerous readers. I may add that it is my attention to collect the papers in which the notices appear, and to send them to Lord John Manners as expressive of the opinions of the different sections of the community.—I am, &c.,

A. CLIFFORD-ESKELL.

8, Grosvenor-street, W.
1st October, 1879.

⁂ The following from a leader in *The Times* of Tuesday, September 9, 1879, will sufficiently explain the nature of the proposed system which, in a half-hearted way, was professed to be tried by the Post Office in 1877:—

There are many cases in which the law admits proof of posting a letter as equivalent to proof of its delivery; and in all these cases, when proof of posting is likely to be required, solicitors and others are obliged to be specially careful in selecting a messenger who is not only trustworthy, but who is also likely to be within reach as a witness at some future time. If a well-arranged scheme were carried into operation, it would of course follow that the Post Office stamped receipt would be recognised as a legal document, and then all that would be necessary would be to affix this receipt to any office copy of the letter which was preserved. Again, there are many tradesmen, chiefly carrying on business in London, who every day send numerous small parcels to country customers by post. The customers would object to the extra cost and trouble of registration, the contents of the parcels being generally only of small value. They are sent to the post, perhaps a hundred at a time, by a messenger who, if dishonest, may retain some of them on the chance that the contents may be convertible into beer, and upon whom there is no effectual check. Such tradesmen receive a regular percentage of complaints of non-delivery from customers, and they have no redress. They cannot tell whether their messenger has been the person in fault or whether the parcels have been lost in the Post Office, or whether a customer may plead non-delivery for the sake of avoiding payment. If they had a book of forms perforated to be torn out easily, and with a line of gum on the back of each, immediately to the right of the perforations, they would affix a form to the face of every letter by a moistened corner, and would receive these forms again from the Post Office, duly stamped, and ready to be gummed into a book for preservation and reference. If any inquiry were made about one of the letters which was missing, the Post Office itself could not fail to be assisted by the clear proof of the when and where of the posting which its own proceeding would have supplied. We hear every now and then of servants failing to post letters which have been intrusted to them, and even of office-boys destroying letters by the score for the sake of stealing the unused stamps. So often has this been done that many large firms seek to protect themselves by having their initials or some other distinguishing mark perforated upon all the stamps used in their establishments, so that these stamps may be no longer saleable.

It will probably be thought that a sufficient case has been made out on the score of the convenience of the public, but the case becomes still stronger when its probable pecuniary results are taken into consideration. There are 14,000 post offices in Great Britain, irrespective of pillar-boxes; and a daily average of 300 farthing receipts at only 2,000 of these post offices would yield a revenue of £200,000 a year. The cost of a fair trial of the experiment would be almost *nil*—would be limited, that is, to the cost of providing forms, which might be as inexpensive as those now used in giving receipts for registration. If the plan were not extensively adopted, it would require no addition to the present staff of the offices; and if it were extensively adopted, it would pay for any addition which might be necessary. It seems as if it would be of unmixed advantage all round; likely to afford increased revenue to the Treasury, increased convenience to the public, and increased facilities to the officials of the post office in tracing lost letters. It is, therefore, fair to ask that it should be tried in a thorough instead of in a nominal and perfunctory manner; and, if not generally in the first instance, at least in the place where it is most certain to be used and appreciated—that is, in the metropolis itself. Moreover, the higher authorities of the Post Office might at least be expected to the concerning it, the language which a great functionary of the department described himself as using on the introduction of the penny system. "This plan," he said, "we know will fail, but it is your duty to take care that no obstruction is placed in its way." There can be little doubt that a similar course of conduct would serve now, as then, conspicuously to illustrate the accuracy of official foresight, and the value which should be attached to official prophecies.

THE FUTURE OF ORGANIC CHEMISTRY.

BERTHELOT has estimated the possible number of compounds of acids with alcohols at 1,400,000,000,000,000. With such a future before them ambitious young chemists need not despair of finding new compounds for centuries to come. The number of new bodies prepared annually will probably not exceed 1,000, but each year will see these numbers grow. Of all these new products less than 5 per cent. have any so-called practical—*i.e.*, commercial—value. A majority, in fact, are never seen again outside of the laboratory where they are discovered, are never heard of after the first description has gone the rounds of the chemical journals, and been finally registered in the big year book, or Jahresbericht, into which are annually posted abstracts of all the minor entries that have been made in the various daybooks and blotters throughout the world. Yet each little discovery, insignificant though it may appear, every new body, useless as it may seem, is valuable. They are the bricks and stones from which a grand and imposing edifice is to be built, and while they may be allowed to lie for years in the rubbish heap, they will one day be sought out to fill their destined place in the structure. It is one man's place to provide the material, another to arrange them in position. As yet the outlines of the building are scarcely discernible; here a tower and there a pinnacle, then an ugly gap. In one place an imperfect foundation is settling and threatening ruin to the stories above; portions of it will need rebuilding; new corner stones are needed here and there; the glittering pinnacles have been misplaced, an overhanging turret threatens the passer-by. Future architects will change the plans, attempt new designs, but complete success is possible only after all the material is on the ground. Let no investigator feel that his little contribution is of no value; it may yet occupy a far more important position than those which for the present serve as capstones and cornice.

Aside from the theoretical value which attaches to these soon-to-be-forgotten compounds, it is worth while to prepare them and to study their properties carefully; it is impossible to prophesy what technical value they may possess or to what they may lead.

The question is often asked, Shall we ever be able to make the valuable alkaloids, particularly quinine? It is too soon to answer this question. A few years ago the synthese of coniine was announced, but it proved to be an isomeric body, a paraconiine. The next trial may give the real article, and then other alkaloids may follow. The recent success of an American in Paris, who prepared the glucosides synthetically, marks an important epoch in synthetical chemistry. The synthesis of cane sugar will probably follow, and who can say where this will lead to? Since the day when Woehler first made artificial urea, many useful forms of synthesis have been devised. Of these the most important commercially was the manufacture of artificial alizarine. Agriculture as well as technical industry was affected by it. Kolbe's synthesis of salicylic acid has proved a boon to suffering humanity. Tiemann's synthesis of vanilline, although much talked of, was necessarily of less importance from the relative small consumption of this flavour. Bayer's recent synthesis of indigo is of no importance to the dyer at present, because his method is too circuitous and expensive, but it is no less the great achievement of a master mind. Another may modify his method and make it profitable.

The first step in the successful imitation of a natural product is to ascertain with certainty its constitution, into what products it is most easily separated, and how these again break up into simpler ones already known. Kolbe knew that salicylic acid could be readily converted into carbolic acid, carbonic acid being liberated. He reasoned, then, that if he could make carbonic acid act upon and combine with carbolic acid, salicylic acid would probably result. By the intervention of metallic sodium the reaction was accomplished, but sodium is too expensive a metal for such a purpose, hence he sought and found a cheaper one in caustic soda; what the latter lacked in energy was compensated for by simply raising the temperature.

The conversion of cane sugar into grape sugar (glucose) is a very simple affair, and has long been understood. The operation seems to consist in the abstraction of the elements of water. Could we not add the elements of water to grape sugar and convert it into cane sugar? As yet it has not been accomplished. The grape sugar has no desire to enter into a partnership with water on such terms as to form cane sugar. Carbon is a queer element, and we cannot always comprehend its idiosyncrasies. Anybody can convert a diamond into charcoal; no man has yet converted charcoal into diamonds. Yet why, we do not know.

Bayer's synthesis of indigo blue furnishes a most instructive example of reversed operations. It had long been known that when indigo is oxidised with nitric acid *isatine* is formed. So Bayer reasoned from this that he must be able to reduce isatine to indigo blue, and in this he succeeded by the aid of phosphorus and chloride of phosphorus. The next step was to prepare the isatine. *Oxindole* can be made from isatine, therefore Bayer thought he could make isatine from oxindole, and after a few unsuccessful efforts he finally succeeded in making isatine. This completed his research, for he had already made oxindole from phenylacetic acid, which in turn is made from some of the coal tar products. The synthesis is complete, although tedious.

In addition to the wide field of pure synthetical chemistry, where coal tar is converted into true imitations of nature's own products, a field as yet but little cultivated, there is another scarcely yet explored—the conversion of one natural product into another and more valuable one, through purely chemical means. The conversion of starch into sugar, and that again into alcohol, is one which nature suggested and in which she assists. Sawdust is converted into oxalic acid and old rags into sweet syrups; but there are still other problems awaiting solution. Stearic acid is much more valuable than oleic. Who will convert the latter into the former? Oil of turpentine is isomeric with oils of bergamot, lemon, and lavender. Who will transpose the first into the others?

It cannot be denied that men have spent years—nay, a lifetime—on fruitless experiments; but the time is near at hand when *intelligent* work is sure to bring some reward, and although few secure great fame or wealth, still fewer go unrewarded. He who makes no experiments is sure to make no discoveries.

NEW PENCIL AS A SUBSTITUTE FOR INK.

WE do not refer here to the aniline pencils which have been in use for some time, but to a quite different pencil which gives a very black writing, capable of being reproduced by the copying machine, and which does not fade on exposure to light. The mass for these pencils is prepared as follows:—10 pounds of the best logwood are repeatedly boiled in 10 gallons of water, straining each time. The liquid is then evaporated down till it weighs 100 pounds, and is then allowed to boil in a pan of stoneware or enamel. To the boiling liquid nitrate of oxide of chrome is added in small quantities, until the bronze-coloured precipitate formed at first is re-dissolved with a deep blue colouration. This solution is then evaporated in the water bath down to a syrup, with which is mixed well kneaded clay in the proportion of 1 part of clay to 3½ of extract. A little gum tragacanth is also added to obtain a proper consistence.

It is absolutely necessary to use the salt of chrome in the right proportion. An excess of this salt gives a disagreeable appearance to the writing, while if too little is used the black matter is not sufficiently soluble.

The other salts of chrome cannot be used in this preparation, as they would crystallise, and the writing would scale off as it dried.

The nitrate of oxide of chrome is prepared by precipitating a hot solution of chrome alum with a suitable quantity of carbonate of soda. The precipitate is washed till the filtrate is free from sulphuric acid. The precipitate thus obtained is dissolved in pure nitric acid, so as to leave a little still undissolved. Hence the solution contains no free acid, which would give the ink a dirty red colour. Oxalic acid and caustic alkalies do not attack the writing. Dilute nitric acid reddens, but does not obliterate the characters.—*Moniteur Scientifique.*

FALSE ANTIQUE POTTERY.—The way to convert modern pottery into the antique is to boil the former in oil and bury it in wood ashes. One will be astonished to find how quickly the new article will become in appearance a veritable antique.

VON HOVEN'S IMPROVED STOCKING SUSPENDER.

THIS invention consists of a suspender, or holder, specially useful for holding stockings, or socks, also ladies dresses.

The suspender is formed, first, of a piece of metal (by preference) so cut or formed that one end forms a kind of tongue or projecting piece. The sides of this piece of metal are turned up, to one end of the projecting sides is fitted a catcher provided with teeth or roughened edge; projections, or points, are formed on the catcher which take into openings, or holes, in the projecting sides of the piece of metal. At the other end of the projecting sides another piece of metal (by preference) is fitted which, when the fastening is closed, overlaps the catcher and fits in between the projecting sides. A strap or band is provided which, when in position, is held by the catcher. In order to accommodate the length of the strap or band to the leg of the person a slide is used provided with a catcher at each end. The band or strap is passed between the piece of metal and the catcher, and the catcher is then turned over, the teeth holding the strap or band. The sock, or stocking, is then passed between the projecting sides and the tongue formed by the piece of metal, and the holder turned, the end of the holder being so curved or formed as to press upon the tongue, and thus the sock, or stocking, is held firmly between same. The tongue is also provided with projections to more securely hold the sock.

In the case of gentlemen the band, or strap, is passed round the leg, and, by slipping the ends through the slide, the same is held (by turning the catchers) by the teeth formed thereon.

In the case of ladies the band, or strap, is preferably fastened by a kind of clip, which is caused to fasten on the end of the corset, or of a belt to be carried round the waist, or the supports can form part of such belt, without the clip. This clip is provided with teeth to hold the band, and further with a spiral or other spring.

In the case of children either the clip can be used, or a ring to be attached to a button on the garments, or a belt, as above.

In the case of a dress supporter the clasp is the same only slightly increased in size.

One, two, or more of these supporters may be used by the person for each garment.

The inventor and patentee is L. von Hoven, of Castle-street.

LAMB'S IMPROVED COWL.

THIS invention consists of a metal cylinder open at both ends, the bottom end fitting over a shaft of less diameter. The top end is left open for exit of smoke or vapour. On the outside of cylinder is fixed semicircular or cup-shaped pieces at equal distances round the centre, on which the wind acts as the propelling power. Inside, near the top of cylinder, are fixed four or more arms radiating from the centre, with square hole, through which it is supported on spindle. On these arms are fixed four or more scythe-shaped blades, with the widest portion at the top, and bent down to a convenient angle for the discharge of smoke or vapour. The lower ends of these blades, which are narrow, are fixed to the lower part of the cylinder, making an incline from the part that rests on the arms.

The spindle on which the cylinder is supported is made hollow, with a solid point having holes near the bottom, a grooved collar of hard steel or other suitable material is fixed about one-third from the top. The top of the spindle is screwed to receive the oil box cap, which has a square head, on which the arms of cylinder are placed, and secured by a screw cap, which also covers up the hole in the spindle. Instead of fixing it on a grooved collar the same can be cast with the spindle; and further, the oil-box cover with the square shoulder on which the arms of the cylinder are placed can also be cast with the spindle in one piece. The oil box is made with a steel or other hard substance at bottom for the spindle point to work in, and extend upwards to the oil-box cap under the arms. A stout metal collar with 3 or more set screws is fixed at equal distances on the outside of oil-box, or same can be cast with the oil-box, to correspond with collar on spindle, by which the spindle is kept in a perfectly upright position; also preventing the cylinder from being lifted out of its place. The oil-box is supported at the top of inner shaft with two or more stays, and it will be seen that the lower portion of shaft or flue is perfectly free from all obstruction. To fill the oil-box it is only necessary to remove the top cap and pour in oil, when it will flow into the box through holes in the spindle, so that both axes are working in oil.

When the cylinder revolves by the action of the wind the blades cut the smoke or vapour, and expel it at the top outlet. Now, although the cylinder is open at top no rain enters the shaft, it being caught by the blades and driven out by centrifugal force between bottom of cylinder and shaft. But it is obvious that a hood or cover could be adopted. By making it with reversed blades in cylinder the action will be changed and a supply of air driven downwards.

The inventor and patentee is J. M. Lamb, of 119, Finchley-road.

THE HYDROMOTOR.

A NEW apparatus invented by Dr. Fleischer, the patents being managed by Fleischer's Patent Hydromotor Company, of Kiel, Germany, is described with illustrations in the *Scientific American*, from which we quote. The craft is propelled without engine, paddle wheels, and is steered without a rudder. The invention is based on the principle of hydraulic reaction, and it embodies several novel and valuable features, which, according to the reports that have reached us, have rendered the hydromotor a success.

The use of a reactive jet of water as a means of urging a vessel forward is not of itself new, but the means employed by the inventor of the hydromotor to draw the water in and eject it are quite novel.

Two cylinders are connected with the steam boiler by suitable pipes, and the steam supply is controlled by a valve. Each steam cylinder has two suction pipes, and two discharge nozzles, connected with the cylinders by pressure pipes. The suction pipe is provided with a valve, and the discharge pipe has a valve. Below the cylinders and between the discharge pipes there is a condenser, having connected with it an air and feed pump. The steam used in the cylinders passes through superheaters which surround the chimneys, and its admission to the cylinders, through the steam valves, is controlled by a float in each cylinder.

The discharge nozzles are swivelled so that they may turn in any direction, and thus control the course of the vessel by changing the direction of the propelling force.

The great difference between this apparatus and its predecessors is that the steam pressure acts directly upon the surface of the water without the intervention of pistons or intermediate machinery. Friction, complications, expense of repairs, liability to breakage, are in a great measure, if not entirely, avoided, and it is said that the method of applying the power has proved highly economical and satisfactory. The boilers of the Pellworm and their appurtenances are precisely like other boilers. The steam is admitted to the upper part of the cylinders through the valves, which are controlled by floats, as before observed. The steam forces the water out through the discharge nozzles with considerable velocity, and the reactive force carries the boat forward. The steam is cut off at the early part of the stroke, and the expansive force completes the work. It may be imagined that considerable loss of power might arise from condensation in the cylinders, but as the water is covered with a film of oil, and a certain amount of oil and hot water clings to the surface of the cylinders and covers the inflowing water, the loss is slight. When the water in the cylinders reaches the prescribed level the exhaust valve communicating with the condenser is opened, and as the vacuum is formed water enters the cylinders through the supply valves, and the operation is repeated.

We have been informed that Commander Grenfell, of the British Navy, a Russian engineer, and the technical director of the Flensburg Ship Yards, recently inspected the hydromotor as applied to the Pellworm, and were all highly pleased with its performances. It is said that the technical director wrote Mr. Howalt, the associate of Dr. Fleischer, that he had been converted from a decided opponent to a friend and champion of the invention, having figured over the formulas used in building the hydromotor and finding them both new and correct. Our informant also tells us that the Imperial German Navy has adopted the hydromotor after a personal inspection by the War Minister.

The Pellworm is 75 feet long, 12 feet beam, draws 3½ feet of water, is flat bottomed, and is capable of steaming 6 knots per hour. The apparatus develops 25 horse power. It has been ascertained that 40 per cent. of power of the steam is realised in the propulsion of the boat.

TO MAKE CLOTH, PAPER, &c., FIRE-PROOF.

SEVERAL preparations for rendering textile and other inflammable fabrics incombustible and practically fireproof have been brought out by MM. Martin and Tessier, of Paris. The compositions are said to be of an inexpensive nature, and capable of rendering incombustible all kinds of readily inflammable substances, such as woven and other fabrics of cotton and other fibrous materials, paper, printed or otherwise, including bills of exchange and other securities, woodwork, theatrical scenery, straw, &c. The first composition, which may be applied to all kinds of fabrics without deteriorating them in any way, consists of:—Sulphate of ammonia (pure), 8 kilos; carbonate of ammonia, 2·5 kilos; boracic acid, 3 kilos; borax (pure), 1·7 kilos; starch, 2 kilos; water, 100 kilos.

It is simply necessary to steep the fabrics in a hot solution composed as above until they have become thoroughly impregnated, after which they are drained and dried sufficiently to enable them to be ironed or pressed like ordinary starched goods.

A second composition to be used for theatrical scenery (or the mounted but unpainted canvas to be used for this purpose), and also for woodwork, furniture, door and window frames, &c., is to be applied hot with a brush like ordinary paint. It is composed of—Boracic acid, 5 kilos; hydrochlorate of ammonia or sal ammoniac, 15 kilos; potassic feldspar, 5 kilos; gelatine, 1·5 kilos; size, 50 kilos; water, 100 kilos. To which is added a sufficient quantity of a suitable calcareous substance to give the composition sufficient body or consistency.

A third composition, to be used for coarse canvas or sail cloth, cordage, straw, and wood, is applied by immersing the articles therein or by imbibition, and consists of—Boracic acid, 6 kilos; hydrochlorate of ammonia or sal ammoniac, 15 kilos; borax (pure), 3 kilos; water, 100 kilos.

A fourth composition, applicable to all kinds of paper, whether printed or not, including securities, books, &c., is formed of—Sulphate of ammonia (pure), 8 kilos; boracic acid, 3 kilos; borax, 1·7 kilos; water, 100 kilos.

The solution is to be placed in a vat heated to 50 degrees C. (122 degrees Fah.) at the end of the paper-making machine, and the paper as it leaves the machine is passed through the solution in this vat, so as to be completely impregnated therewith, after which it is dried upon a warm cylinder and then wound on a reel. If the paper be in sheets or printed it is simply immersed in the above solution, heated to 50 degrees C., spread out to dry, and afterward pressed to restore the glaze destroyed by the moisture.

The above compositions are said to ensure a degree of incombustibility without precedent as regards the preservation of the materials to which they are applied. The proportions of the several ingredients are given as examples only, and may be varied as found necessary in practice.

A NEW COLOURING MATTER.

DR. T. L. PHIPSON, according to a note recently presented by him to the French Academy of Sciences, has succeeded in extracting from the little blood-red alga (*Palmella cruenta*) found at the base of damp walls, a new rose-red colouring matter, which exhibits very curious properties. Mr. Phipson proposes for it the name of Palmelline. Its colour resembles no known colour except the colouring matter of the blood,—the hæmoglobine of modern chemists. Like the latter, palmelline is insoluble in alcohol, ether benzine, bisulphide of carbon, &c., but dissolves in water. Like the colouring matter of blood, palmelline is dichromic, consisting of a red matter united with an albuminous substance, and being coagulated by alcohol, heat, and acetic acid added to its aqueous solution. Like hæmoglobine, too, palmelline gives rise to absorption bands in the yellow of the spectrum, but these bands did not seem to Mr. Phipson to occupy exactly the same position as those given by blood. Palmelline in solution, like the colouring matter of blood in solution, readily undergoes putrefaction at summer heat, giving out a strong ammoniacal odour and a smell of rotten cheese. Finally, like the colouring matter of blood, palmelline contains iron. This new colouring substance cannot be extracted from the moist plant, for the vitality of the latter is such that it will not part with its colour by the action of water, it has to be first dried in a current of air. At the end of from twenty-four to thirty-six hours the pellicles are usually pretty dry, for the plant and the matters upon which it grows dry quite rapidly in the air. It must not be dried on paper, for the cells would adhere thereto. On leaving the dried plant in a small quantity of water in a covered porcelain capsule, the colouring matter dissolves out, and on the following day, the clear liquid may be decanted from it. The colouring matter is of a magnificent rose-red by transmitted light, and of an orange-yellow by reflected light.

From the properties above noted, it will be seen that palmelline appears to exhibit considerable analogy with the hæmoglobine of the blood; and, as Mr. Phipson says, it is the first time that a substance of this nature has been met with in the vegetable kingdom.

THE OLDEST SCIENTIFIC LECTURER.—M. Chevreul, now in his 93rd year, began his usual course of lectures on organic chemistry at the Museum of Natural History, Paris, on June 10th.

HOW TO REMOVE NITRATE OF SILVER STAINS FROM CLOTHING.

IN the manipulation of the nitrate of silver bath solutions in photography the operator frequently receives stains of the salt upon his clothing, which are not very attractive in appearance. The question of their removal has been a puzzle to many. Nitrate of silver, it will be remembered, is the base of most of the so-called indelible inks used for marking linen in almost every household. Stains or marks of any kind made with the above silver solution or bath solution may be promptly removed from clothing by simply wetting the stain or mark with a solution of bichromate of mercury. The chemical result is the change of the black-looking nitrate of silver into chromate of silver, which is white or invisible on the cloth. Bichromate of mercury can be had at the drug shop. It is slightly soluble in water, is a rank poison, and we would not advise anybody to keep it about one's house.

RECENT DECISIONS RELATING TO PATENTS, TRADE MARKS, &c.

BY THE U.S. CIRCUIT COURT.—SOUTHERN DISTRICT OF NEW YORK.

Stove Trade Mark.—Filley v. Child.

THE plaintiff having acquiesced for a long time in the manufacture and sale by defendant of cooking stoves containing certain improvements patented by plaintiff, and to which the name "Charter Oak" had been applied as a trade mark, and the patent having expired, defendant cannot be prevented from calling such stoves by the name of "Charter Oak," so long as he does not represent them as being made by the plaintiff, or induce others to believe that they are made by the plaintiff.

LOWRIE'S UNION JOINT COUPLING.—Mr. Ralph Lowrie, of Newcastle-on-Tyne has (says the *Newcastle Examiner*, from which we quote) recently protected an invention, and which promises to completely revolutionise the existing state of things to which it applies. The patent is styled "An improved union-joint or coupling for pipes and tubes." The plan now generally used for connecting beer engines with the barrels in the cellar, is a pipe attached to the tap by screw and nut. To obviate the disadvantage of this arrangement, and to facilitate the attachment, Mr. Lowrie uses an elastic tube, with a cup or bell-shaped mouth, having a flange round the edge and the tap which enters the barrel, furnished at its outward extremity with a spherical knob having a central perforation, over which the bell-shaped mouth of the tube can be easily slipped. The tube is secured in position by a cap or cover which is slipped over the tube prior to fitting the same to the end of the tap. This cover is slotted, to fit loosely over two projecting arms at the base of the spherical termination of the tap, and by means of a bevelled surface to these arms, a quarter-turn to the cap is sufficient to join the flange between the cap, and the flat base of the spherical termination of the tap. Mr. Lowrie's method of coupling may also be applied to pipes for air, or water and other fluids—the joint being both air and water-tight, and suited for side, down, and up "draught," as well as for fire-hose couplings. As we have stated, Mr. Lowrie has had his invention duly protected. It has already attracted sufficient attention to justify the appointment by Mr. Lowrie of agents in the principal commercial centres. Simplicity, efficacy, and originality are all manifest in this the latest local patent. It has only to be known to be appreciated and adopted.

CLIFF'S IMPROVED FURNACES.

By constructing tubular furnaces according to this invention the same will be specially useful to the "blind roasters" of the manufacturers of "salt cake," or sulphate of soda.

These furnaces are at present constructed of an outer and inner arch, and a bed of tiles resting on flue walls, the first of 9 inch or 14 inch fire bricks, and the second of 4½ inch fire bricks, or bent fire tiles, between which the flames from the fire play. To secure the necessary temperature inside the roaster through 4½ inches of material necessitates a very high temperature in the flues, and the inner arch, or, and in a minor degree, the bed, as the joints in a bed are very much less than the arch, which is, under present style, the faulty point as to jointings and thickness, there being so many joints they are very liable to let the gas escape into the flues. To hold up these arches the sides of the furnace are "braced" up and round at a very great expense in iron.

Now the invention purposes to replace the double, heavy, and many-jointed arch by radiated tubes, or hollow bricks or blocks, or properly hollowed pieces of suitable material, by which means two-thirds of the present weight is saved. The inner arch, as one side of a tube can be used of less than half the thickness of material now adopted, and thus less coals are burnt, and the flue temperature reduced, or what is equivalent, the charges are roasted quicker, or heavier, than is now the case. Assuming tubes of 36 inches by 24 inches to be used, the jointing in a furnace 30 ft. by 8 feet is reduced more than nine-tenths, with corresponding saving in fire-clay and erection, and much less iron than now used, suffices to brace up, as one tie rod round special shaped springers holds the light structure. The few joints there are are deeper or longer than those in the ordinary brick or tiled arch. The flues may be made large enough to enter, if needed, and can have any kind of junction, or door, fitted for examination, or introduction of tools. Any one pipe can be lifted out without disturbing the rest of the arch, or part, or all, can be made in halves or other divisions. The floor, or bed, and sides, may also be constructed of tubes, pipes, or hollow blocks, or hollow pieces, though of other shapes. The inventor and patentee is John Cliff, of Runcorn.

CUSTING'S FLANGE COUPLING.

This coupling arrangement is designed for connecting sections of pipe at different angles. The invention consists of two circular plates, each flat upon one side, and having on the other a short internally threaded tubular projection inclined at an angle of 45° to the plane of the plates. The plates are slotted to receive the bolts that fasten them together. This coupling serves as an elbow for pipe and for forming in pipes a joint of almost any desired angle. A patent for the United States for this invention has been recently secured by Mr. Charles H. Cushing, of Tidioute, Pa., United States.—*Scientific American.*

THE SYDNEY EXHIBITION.

The International Exhibition at Sydney, New South Wales, was opened September 17th, with promises of great success.

Great Britain has 800 industrial exhibits and 513 of fine arts. Germany has 691 entries, and Austria 170. France has 350 industrial exhibits and 168 of fine arts. Belgium has 236 industrial exhibits and 50 of paintings. America has 150 industrial exhibits.

The State Department at Washington announces that thirty or more of our leading manufacturing firms are represented.

PHOTOGRAPHIC ILLUSTATION OF MENTAL OPERATIONS.

Professor Huxley illustrates his argument respecting complex impressions which are more or less different from each other by reference to composite portraiture, thus:—"This mental operation may be rendered comprehensible by considering what takes place in the formation of compound photographs, when the images of the faces of six sitters, for example, are each received on the same photographic plate for one-sixth the time requisite to take one portrait. The final result is that all those points in which the six faces agree are brought out strongly, while all those in which they differ are left vague; and thus what may be termed a *generic* portrait of the six, in contradistinction to the specific portrait of any one, is produced."

RECENT AMERICAN AND FOREIGN PATENTS.

Mr. Richard H. Hill, of New Haven, Conn., has patented an improved safety elevator, which is so constructed that the motion of the operating mechanism may be reversed automatically as the platform reaches the upper and lower points of its movement, and which will apply a brake automatically when shifting the driving belts, so that the platform cannot run down accidentally.

Mr. Martin J. Racer (William Racer, administrator), of La Grange, Texas, has patented an improved suspender button that may be quickly and firmly attached to garments, and that is not liable to tear the cloth or become accidentally loosened.

Mr. Griffith B. Thomas, of Point Pleasant, West Va., has invented an improvement in iron roofing, which consists in forming the joints between the sheets by crimping the edge of the one over the turned up edge of the adjoining sheet the whole length, and then fastening them by clips of tin.

Mr. Benjamin F. Wood, of New Haven, Conn., has invented an improved frame for drying lace curtains under tension. It is simple in construction, and will hold the curtains under a uniform tension while drying. When not required for use it can be folded into compact form for storage or transportation.

Mr. Paul H. Seager, of Manteno, Ill., has patented an improvement in stove pipes, which consists of a section of pipe unrivetted at the lower end so that its diameter at this end can be increased and diminished at pleasure by means of a lever pivotted to the pipe on one side and connected by a strap with the other side. By moving the lever back and forth the pipe is contracted and expanded, and secured in any desired position by a pawl engaging a ratchet-guard over the lever.

An improvement in flour bolts has been patented by Mr. Josiah J. Zinn, of Union City, Pa. The object of this invention is to construct the reels so that a smoother surface will be given to the bolting cloth, for the purpose of permitting a sliding motion of the meal when it is in operation, and thus enable the flour to be bolted more evenly and cleanly than is now done.

Mr. Rienza A. Goldsmith, of Washingtonville, N. Y., has invented an improvement in thill couplings, which consists in forming upon the head of a coupling bolt a plate a plate with a hole through which the cam bolt passes, so that the coupling bolt may be secured by the nut that holds the cam bolt.

A composition for water filters, formed of clay, sand, wood sawdust, pulverised pumice stone, and English calcimine, mixed together in about equal quantities, with sufficient water to reduce the mixture to a plastic state, has been patented by Mr. Jean B. Ader, Ainé, of New Orleans, La.

An improved flood-gate, which is so constructed as to swing open as the water rises and swing shut as the water falls, which will prevent trash from lodging about its hinges, and may be readily adjusted to the height of the water at different seasons of the year, has been patented by Mr. William B. Akers, of Little River, Va.

Mr. John Ames, jun., of New York city, has patented an improvement in making brushes. The invention consists in a knot formed by dipping the loose butts of the bristles into melted pitch, glue, or cement, and inserting them in a form, where they are allowed to cool or harden.

Mr. Louis A. Bringier, of Ascension Parish, La., has patented an improvement in back bands for plough harnesses. It consists in a connecting device of peculiar form for holding the traces and preventing their detachment.

An improvement in the class of foot rests which are composed of two plates or thin boards hinged together, so that when the device is in use one of the plates is at right angles to the other, but when not in use one plate may be folded flat upon the other, is the invention of Mr. Henry Jungmann, of Madison, Wis.

Mr. Maximilian C. F. Nitze, of Dresden, Saxory, has patented an improvement in application of electric light to a speculum. The object of the invention is to provide a means for direct illumination and examination of internal parts or cavities of the body, as the urethra, the bladder, the larynx, the esophagus, the stomach, the uterus, the outer auditory passage. This method, and the instruments constructed according to this method, afford the possibility of introducing the source of light into the internal parts or cavities themselves for examining the part directly, or its reflected image. Lenses or lens systems for enlarging the field of view may be employed in combination with his instruments. The source of light employed in these instruments consists in a platinum wire made incandescent by an electric current. The white heat of this wire is taken up and made harmless by means of a cold water current flowing along the circuit wire.

An improved machine for perforating papers, so that letters, numbers, or other characters may be represented thereon by a series of perforations, has been patented by M. Henri Le Poirer, of Paris, France. The punch holder is so constructed that the punches may be readily replaced when they are worn, and they may be grouped in the prisms so as to change the characters to be reproduced in perforations.

Mr. Albion B. Parkman, of St. Albans, Me., has invented an improved hame fastener, which consists of the hollow shank or body containing snap hooks, the shank of one of which has sharp teeth on its upper face, while the shank of the other is provided with square teeth on its upper face, which are held in the shank by the dogs that are pivoted within the body of the fastener, and made to engage with the teeth of the snap hooks by a curved spring.

An improved washing machine has been patented by Mr. Zohar Doyle, of Ogden, Ill. It consists of two semi conical pressers, with air tubes to prevent suction, mounted in a head held upon a frame operated by a lever and springs, and adapted to be shifted about, so as to be directed upon the surface of all the clothing.

Mr. Emery M. Pike, of McDonough, N. Y., has patented improvements on the butter worker for which letters patent No. 179,053 were granted to him June 20, 1876. In that apparatus a frame, provided with a trough or gutter, supported a reciprocating tank provided with an eduction pipe. The present invention consists in details of construction and arrangement of various parts of the apparatus, whereby provision is made for lessening the friction, for disposing of the brine, and for insuring the proper operation of the apparatus.

An improvement in bottle stoppers, patented by Mr. William Beardsley, of Beacon, Iowa, consists in combining a stopper provided with shoulders, a tubular extension, an orifice, a flanged plug with a bottle neck having a straight bore, and a counterbore for receiving a packing ring and spiral spring.

An improved refrigerator, patented by Mr. Cyrus B. Shaw, of Brooklyn, N.Y., is constructed so as to use less ice than refrigerators made in the usual way, and it can be more easily kept clean and sweet, and may be more easily repaired.

Mr. William Roush, of Yates center, Kan., has invented an improvement in lanterns which relates to the construction and arrangement of a lamp chimney and frame in a lantern. The object of the invention is to enable the parts to be put together or taken apart easily and quickly, so that the parts can be combined into a lantern adapted for immediate and general use, or the lamp can be taken out and used for ordinary domestic purposes.

Mr. Allen Blewett, of Brookville, Miss., has patented an improved toy pistol, having the barrel and stock or handle made in one piece, the barrel having a slot in its under side, which extends its whole length, to receive the slide, and the stock having a recess in its under side to receive the trigger. In this pistol a rubber spring is used to propel the projectile.

Mr. Joseph H. Stratton, of Beloit, O., has patented an adjustable support for carriage bodies, coffins, and other similar articles while undergoing painting, varnishing. It is arranged so that they can be set in any desired position to accommodate them to the position of the workman. The invention consists of a table or stand provided with devices for holding the body, and pivoted to the end of a lever fulcrumed between two uprights or standards, and with arrangements for securing it in different positions.

An improvement in stiff hat flanges has been patented by Messrs. Lewis L. Smith, Frederick L. Knable, and Henry F. Smith, of Orange, N.J. The flange is made in two parts, with the lines of division at the front and rear, and with the end edges of the one part convex and the end edges of the other part concave, to adapt the flange to be withdrawn from the hat without changing the shape of the hat brim.

Mr. Edward Kuhn, of New Albany, Ind., has invented an improved grate, which consists of one or more cylindrical revolving grates pivoted horizontally in the lower part of the firebox, and made to shake out the ashes and agitate the fire by turning on their axes.

Mr. John G. Hess, of Guttenburg, N.J., has patented an improvement in spigots or faucets for drawing liquids from barrels. The invention consists in a packing ring of elastic material contained in an annular recess in the spigot around the plug, the aperture of which is concentric with the axis of the plug.

An improved fish trap, patented by Mr. William J. Henderson, of Valdosta, Ga., consists in combining a transparent bottle with a rat trap, so that the fish or animal may be caught without consuming the bait.

Mr. August Buermann, of Newark, N.J., has invented an improvement in spurs, which consists of a stay plate in combination with the heel band of a spur made of two bars and having their rear ends projecting to the rearward, and parallel with each other, to serve as a rowel holder.

Mr. Montague S. Hasie, of Vicksburg, Miss., has patented a novel mechanism to be employed for the utilisation of refuse cotton, technically known as "cotton motes." This consists of the refuse of the cotton gin after the process of ginning, and it has heretofore been thrown away as useless, although known to contain a large proportion of cotton fibre, the difficulty of separating the cotton from the foreign substances being considered too great to justify the expenditure of the necessary time and labour in that direction. By this machine the cotton fibre is separated from the foreign substances, and is cleaned and condensed, so as to produce from the motes a large proportion of cotton of a good quality, and thereby to make use of what was formerly a total loss.

Mr. Louis W. Ott, of Indianapolis, Ind., has patented a bed lounge that forms a lounge or couch when closed, and when open forms a bed. It consists in a movable front piece hinged to the upper portion of the bottom, and connected by a link with the lower portion, so that as the upper portion of the bottom is turned on its hinges the front piece is carried with it and drops down out of the way.

Messrs. T. R. Williams, E. R. Williams, and W. J. Williams, of Pittsburg, Pa., have patented an improved sand washing machine. The object of this invention is to furnish an improved machine for washing and cleaning sand as it is raised from a river. The invention consists in the combination of a tapered cylindrical rotating screen, provided with scroll paddles and an elevator for carrying the sand out of the box or well after it has been washed.

An improved hub-boring machine, patented by Mr. Alexander J. Mongey, of Carthage, N.Y., consists in a novel arrangement, a mandrel, a pair of chucks, a series of adjustable centreing plates, and an adjustable bit or cutter, whereby provision is made for centreing the work, holding it securely in position, and accurately boring the hub.

Mr. Aaron C. Vaughan, of Shane's Crossing, O., has invented a simple and effective form of nut lock which is applicable to the ordinary screw-threaded bolt without alteration. It consists in a nut of the ordinary form having a screw-threaded hole through the centre, and having its face slotted about half way through the thickness of the nut, and the edges of the slot drawn together.

Mr. Alexander Gordon, of New York city, has patented an improved ship's log, which is so constructed as to count and register the number of knots run out in a quarter of a minute, and also indicate the knots by sound. It can be readily used by one man, and it is simple in construction and apparently reliable.

An improvement in the class of cotton presses whose followers are operated by a screw or screws, and are provided with an automatic mechanism for shifting the driving belt, and thus arresting the follower either in its ascent or descent, has been patented by Mr. George Cooper, of Augusta, Ga. Its construction cannot be readily described without an engraving.

An improved form of axle box and journal for vehicles has been patented by Mr. James A. Manning, of Danville, Ind. It prevents rattling, and it may be adjusted compensate for wear; the journal will retain the oil or grease, and the box is prevented from wedging upon the journal.

An improvement in side-bar wagons has been patented by Messrs. William and Cyrus R. Fenstermacher, of Shippensburg, Pa. The invention consists in combining with the king bolt and fifth wheel a stay or brace having rear branches secured to side bars passing up on the inside of fifth wheel, and having the front branches fastened to the bolster.

An improved monkey wrench has been patented by Mr. Baziel W. Lloyd, of Jackson, La. It consists in the combination of a box having arm and screw cutter sections held in the box, and a wrench having parallel jaws, the movable one being provided with a socket for holding the dies.

Mr. Moses R. McGregor, of Pine Bluff, Ark., has invented a lap ring or link of novel construction, adapted for use with plows and chains, and wherever available. It consists of the two flat links of similar size and shape, each having an opening at one side and connected together. Upon one link is fixed a flat-sided pin or lug, which passes through a slot is formed in the other link. This pin is headed or upset upon the link so as to retain the links together.

Mr. Daniel Kunkel, Sr., of Oregon, Mo., has patented an improved washing machine, which may be applied to an ordinary washtub. It is simple, convenient, and effective. It is an improvement upon the washing machine for which letters patent No. 155,873 were granted to the same inventor, Oct. 13, 1874.

An improved clay press has been patented by Mr. Simeon G. Phillips, of Perth Amboy, N.J. The object of this invention is to construct a press or adapt the ordinary presses for pressing clay in thin sheets one half the usual thickness, more or less, and sufficiently dry for the potter's use, without increasing the bulk of the press or using more cocks to produce the usual amount obtained at one pressing.

An improved attachment for clocks, to be connected with a self-lighting and self-extinguishing attachment for gas burners, which shall be so constructed that the gas will be lighted and extinguished automatically at fixed times, so long as the clock continues to run, so that the only attention required will be to wind up the clock at the proper time, has been patented by Mr. Simon Goldsmith, of Boston, Mass.

Mr. John F. Curtice, of Fort Wayne, Ind., has invented an improvement upon the car brake shoe, patented March 21, 1876, by I. H. Congdon, in which detached pieces of wrought iron are embedded in a body portion of cast iron, by casting the said body portion around the wrought pieces, whereby the wearing face of the shoe is composed in part of wrought iron, and is enabled to better resist wear, and gives an increased friction for stopping the motion of the car. The object of this invention is to provide such a construction of this composite brake shoe as will, while retaining and even increasing the wearing qualities, also secure the requisite strength to resist the breakage to which its use renders it liable, and at the same time allow the use of a much lighter and less expensive shoe.

Mr. James Tripp, of Coldwater, Mich., has patented improvements in that class of sewing machines in which a revolving shuttle takes the upper thread from the needle and loop it around the lower thread, which is carried by a bobbin contained within said revolving shuttle. The invention consists in the peculiar arrangement of the revolving shuttle with respect to its driving mechanism, its holding plates, and other cooperating parts, and in the means for facilitating the removal of the shuttle and its bobbin.

Mr. Samuel T. Harrison, of San José, Cal., has patented an improvement in magazine farm arms, which consists of a carrier having an intermittent vertical movement controlled by a lever connected with a finger on the guard, which receives the cartridge from the magazine, carries it to the breach of the piece, and when it is ejected into the breach, returns and locks the breach-block in place behind it. Also, a breach-block in which is sheathed the needle, connected by a link with the finger of the guard, from which it receives an intermittent reciprocatory movement, serving to drive the cartridge from the carrier into the breech.

Postponements.—Notices of Cowdery's Knife-cleaning Machine and Hutchins on Balloons unavoidably stand over.

THE INVENTORS' INSTITUTE,

ESTABLISHED 1st MAY, 1862.

FORTNIGHTLY MEETINGS, DURING SESSION,

HELD (NOVEMBER TO MAY INCLUSIVE) AT

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